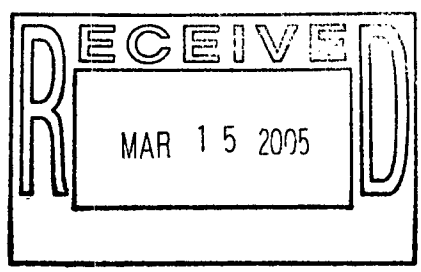
Environmental Restoration
RFCA Standard Operating Protocol
for Routine Soil Remediation
FY05 Notification #05-04
IHSS Group 800-3

Approval received from the Colorado Department of Public Health and Environment

(February 1, 2005)

Approval letter is contained in the Administrative Record.



ADMIN RECORD

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ACRONYMS

AAESE	Accelerated Action Ecological Screening Evaluation
AL	action level
BMP	best management practice
CDPHE	Colorado Department of Public Health and Environment
cy	cubic yard
D&D	Decontamination and Decommissioning
DOE	U.S. Department of Energy
EDDIE	Environmental Data Dynamic Information Exchange
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ER RSOP	Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation
FY	Fiscal Year
HRR	Historical Release Report
IA	Industrial Area
IASAP	Industrial Area Sampling and Analysis Plan
IHSS	Individual Hazardous Substance Site
IMP	Integrated Monitoring Plan
MDL	method detection limit
ug/l	microgram per liter
mg/l	milligram per liter
nCi/g	nanocuries per gram
NPWL	New Process Waste Lines
OPWL	Original Process Waste Lines
PAC	Potential Area of Concern
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PCOC	potential contaminant of concern
pCi/g	picoCuries per gram
POC	Point of Compliance
POE	Point of Evaluation
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RSOP	RFCA Standard Operating Protocol
SAP	Sampling and Analysis Plan
SSRS	Subsurface Soil Risk Screen
SVOC	semi-volatile organic compound
TCE	trichloroethene
TPH	total petroleum hydrocarbons
UBC	Under Building Contamination
VOC	volatile organic compound
WRW	wildlife refuge worker

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1.0 INTRODUCTION

This Environmental Restoration (ER) Rocky Flats Cleanup Agreement (RFCA) Standard Operating Protocol (RSOP) for Routine Soil Remediation (ER RSOP) Fiscal Year (FY) 05 Notification addresses the remediation of Individual Hazardous Substance Sites (IHSSs) at the Rocky Flats Environmental Technology Site (RFETS) Industrial Area (IA). The purpose of this Notification is to invoke the ER RSOP for IHSS Group 800-3. The IHSSs/Potential Areas of Concern (PACs) and Under Building Contamination (UBC) Sites associated with IHSS Group 800-3 are as follows:

- UBC 883
- Tank 25, Original Process Waste Lines (OPWL) (750-Gallon Steel Tank) - PAC 000-121
- Tank 26, OPWL (750-Gallon Steel Tank) - PAC 000-121
- Radioactive Site South of Building 883 - PAC 800-1201

In addition to these sites, this Notification also invokes the ER RSOP for the Building 883 storage area located adjacent to the building on its western side (northern half).

Soil with contaminant concentrations greater than the RFCA action levels (ALs), or as indicated by the Subsurface Soil Risk Screen (SSRS), and associated debris will be removed in accordance with RFCA (DOE et al 1996, 2003) and the ER RSOP (DOE 2003a).

The location of IHSS Group 800-3 is shown on Figure 1. All associated IHSSs, PACs and UBC Sites in IHSS Group 800-3 are proposed for remediation under ER RSOP Notification #05-04 (Table 1).

Table 1
Potential Remediation Areas for IHSS Group 800-3

IHSS/PAC/UBC Site	PCOCs	Media	Estimated Remediation Volume
UBC 883	Radionuclides Metals VOCs SVOCs	Building Debris and Subsurface Soil	Debris - ~6,000 cy Soil - < 5 cy
Valve Vault 2 - PAC 800-1200	Radionuclides Metals VOCs SVOCs	Valve Vault Debris and Subsurface Soils	Debris - <10yds^3 Soil - < 5yds^3

IHSS/PAC/UBC Site	PCOCs	Media	Estimated Remediation Volume
Tank 25, OPWL (750-Gallon Steel Tank) - PAC 000-121	Radionuclides Metals VOCs SVOCs	Tank Debris and Surface and Subsurface Soil	Debris - <10 cy Soil - < 5 cy
Tank 26, OPWL (750-Gallon Steel Tank) - PAC 000-121	Radionuclides Metals VOCs SVOCs	Tank Debris and Surface and Subsurface Soil	Debris - < 10 cy Soil - < 5 cy
Radioactive Site South of Building 883 - PAC 800-1201	Radionuclides	Surface Soil	Debris - < 10 cy Soil - < 5 cy

In addition to IHSS Group 800-3, the Building 883 storage area located west of the building is included in this Notification. Building personnel suspect surface soil contamination may be present at the Building 883 storage area where chemicals were routinely spilled and/or discarded. Potential contaminants of concern (PCOCs) for this site includes radionuclides, metals, and semi-volatile organic compounds (SVOCs).

Activities specified in the ER RSOP (DOE 2003a) are not reiterated here; however, deviations from the ER RSOP are included where appropriate.

2.0 IHSS GROUP 800-3

Historical data describing soil contaminant concentrations greater than the Site background means plus two standard deviations (radionuclides and metals) or the method detection limits (MDLs) (organics) are depicted in Figure 2.

2.1 PCOCs

PCOCs for IHSS Group 800-3 and Building 883 storage area are identified in Section 1.0. The PCOCs were determined based on historical surface soil sampling data, as shown on Figure 2, and process knowledge. The ongoing accelerated action characterization will be used to further define any necessary remediation.

Only two surface soil samples were collected near IHSS Group 800-3; the one closest to Building 883 was for characterization of Transformer Site 15, which received No Further Accelerated Action Status in FY04. The data indicate radionuclides, metals, SVOCs, and PCBs are present above background levels (Figure 2). No subsurface soil sampling data exist in the area of IHSS Group 800-3.

Figure 1
IHSS Group 800-3
Location Map

KEY

- UBC
- PAC
- Demolished building
- Standing building
- Paved area
- Stream, ditch, or drainage

N

300 0 300 Feet

Scale = 1:6,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared for: KAISER•HILL COMPANY

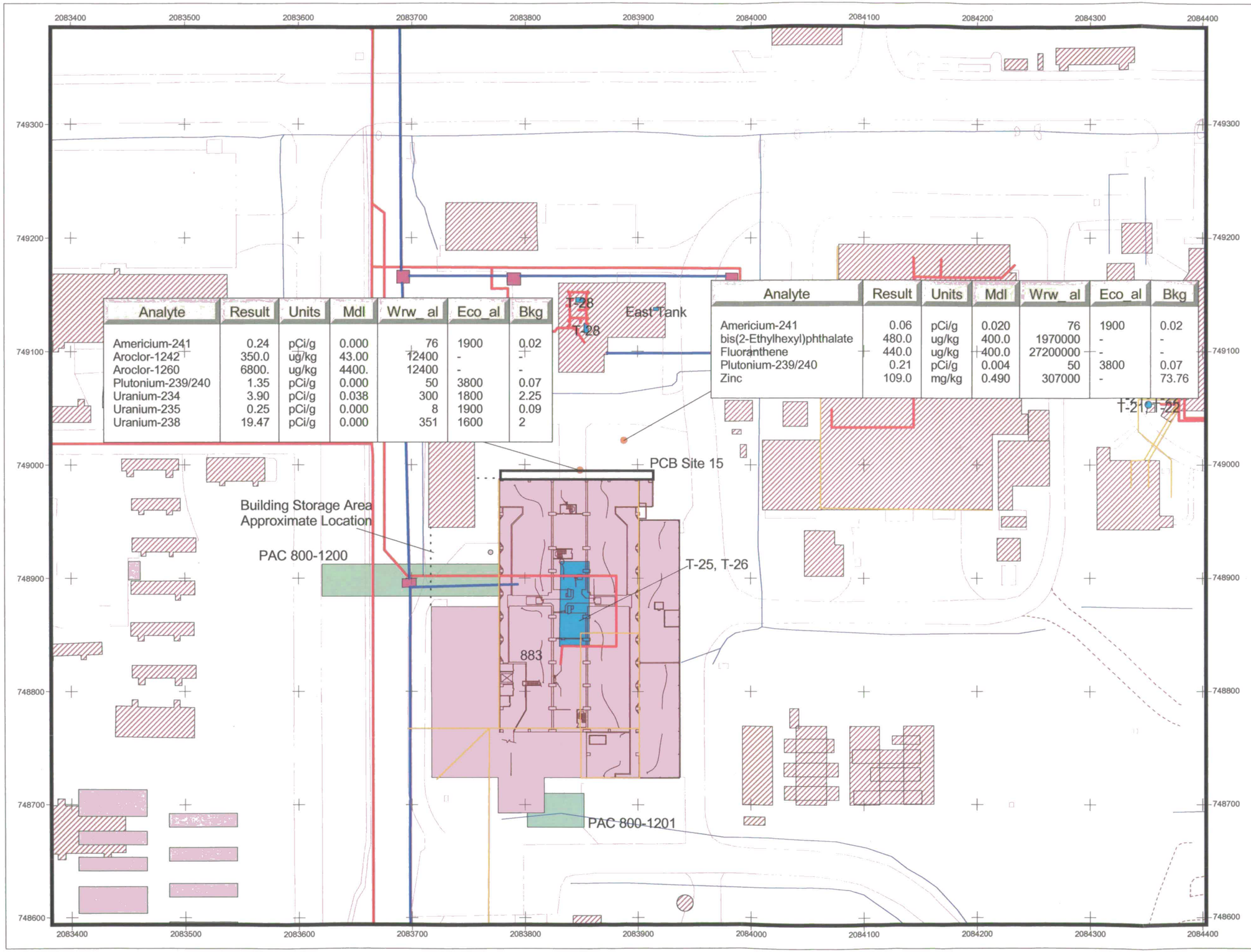
Prepared by: RADMS

File: w:/projects/2004/800-3/800-3char10-13-03sps.apr Date: 12-29-03

Figure 2
IHSS Group 800-3
Existing Sampling Locations With Concentrations Greater Than Background Means Plus Two Standard Deviations or Method Detection Limits

Analyte	Result	Units	Mdl	Wrw_al	Eco_al	Bkg
Americium-241	0.24	pCi/g	0.000	76	1900	0.02
Aroclor-1242	350.0	ug/kg	43.00	12400	-	-
Aroclor-1260	6800.	ug/kg	4400.	12400	-	-
Plutonium-239/240	1.35	pCi/g	0.000	50	3800	0.07
Uranium-234	3.90	pCi/g	0.038	300	1800	2.25
Uranium-235	0.25	pCi/g	0.000	8	1900	0.09
Uranium-238	19.47	pCi/g	0.000	351	1600	2

Analyte	Result	Units	Mdl	Wrw_al	Eco_al	Bkg
Americium-241	0.06	pCi/g	0.020	76	1900	0.02
bis(2-Ethylhexyl)phthalate	480.0	ug/kg	400.0	1970000	-	-
Fluoranthene	440.0	ug/kg	400.0	27200000	-	-
Plutonium-239/240	0.21	pCi/g	0.004	50	3800	0.07
Zinc	109.0	mg/kg	0.490	307000	-	73.76



Existing Sampling Location
UBC
PAC
OPWL
NPWL
Valve Vault
Tank
Foundation Drain
Paved Area
Stream, ditch, or drainage

Building
Demolished
Standing

N

50 0 50 Feet

Scale = 1:1,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared for: KAISER•HILL COMPANY

Prepared by: RADMS

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Date: 12-29-03

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With respect to process knowledge, radionuclides, metals, SVOCs, and volatile organic compound (VOCs) are considered PCOCs. Building 883 was constructed to handle uranium and metal rolling and forming operations. Beryllium, copper, and other metals and alloys were occasionally worked on in the building. Hydraulic oil used in the heavy machinery within the building occasionally leaked into the concrete pits beneath the equipment. Vapor degreasing (a hot solvent vapor process) was used to clean metal parts.

It is noted that PAC 800-1201 consists of radionuclide-contaminated surface soil south of Building 883, and therefore, radionuclides are the only PCOCs for this PAC.

2.2 Project Conditions

From a potential soil and debris remediation perspective, the most notable features of IHSS Group 800-3 are as follows:

- UBC 883, which is located beneath the Building 883 slab. The slab contains pits that formerly held heavy machinery used in the building. The levels of slab contamination vary with the deeper areas of the slab more contaminated than the shallower areas.
- Tanks 25 and 26, and associated OPWLs located in the basement of Building 883 (Figure 2). The tanks and piping within the building were removed during decommissioning. Pipe stubs remain in the slab and there is some piping under the slab that will require removal during slab removal.
- Resource Conservation and Recovery Act (RCRA) Tanks T-1 and T-2, and associated process lines. These RCRA units are acid etch tanks located in Room 139. These tanks have a concrete secondary containment; however, the Historical Release Report (HRR) (DOE 1992) notes that process wastewater overflowed from a tank in Room 139, and some of the water flowed under the wall.
- PAC 800-1200, Valve Vault 2 was flushed clean (Regulatory Contact Record. The New Process Waste Line from the valve vault to Tanks T-1 and T-2 in Room 139 still exist.
- PAC 800-1201, an area reported to have radionuclide-contaminated surface soil.
- The storage area west of Building 883, which may have some surface contamination based on undocumented historical knowledge.

2.3 RFCA SSRS

The SSRS is performed when non-radionuclides and uranium are present in soil below a depth of 6 inches, and when americium and plutonium are present below a depth of 3 feet (DOE et al 2003). Current site conditions are evaluated to determine whether remediation is required in accordance with the SSRS.

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Subsurface soil data for IHSS Group 800-3 are not available. Therefore, the SSRS evaluation will be postponed until data from the IHSS Group 800-3 characterization have been collected in accordance with IA and Buffer Zone (BZ) Sampling and Analysis Plan (IABZSAP) Addendum #IA-04-06. Under building sampling will be conducted after the slab and pits have been removed. Sampling was attempted during decommissioning; however, the gravel layer beneath the slab made the sample collection impracticable. Accelerated action characterization sampling is ongoing and will be used to define the remediation. Contact Records will be utilized to document any remediation. Results will be documented in a closeout report.

2.4 Remediation Plan

This RSOP Notification remediation plan for IHSS Group 800-3 includes the following objectives:

- Remove the Building 883 slab unless shown to not be contaminated.
- Remove ~~as well as~~ the building footers, concrete pits, and tanks and process waste lines to a depth of 3 feet below final grade. The concrete will be disposed at an appropriate facility based on waste characterization results.
- Disrupt the southern foundation drains.
- Survey gravel to determine if it can be left in place.
- Remove soil with non-radionuclide or uranium contaminant concentrations greater than the RFCA wildlife refuge worker (WRW) ALs to a depth of 6 inches. If soil contamination greater than the ALs extends below 6 inches in depth, perform the SSRS to evaluate the need for further accelerated action.
- Remove soil with plutonium-239/240 or americium-241 activities greater than the RFCA WRW ALs to a depth of 3 feet, or to less than the applicable AL, which ever comes first. If concentrations are greater than 3 nanocuries per gram (nCi/g) between 3 and 6 feet, characterize and remediate pursuant to RFCA Attachment 5 (DOE et al 2003). If plutonium-239/240 or americium-241 is present at activities greater than the RFCA WRW AL but less than 3 nCi/g below 3 feet, conduct an SSRS.
- Remove OPWL drains and piping within 3 feet of the existing grade in accordance with the RSOP for Facility Disposition (DOE 2000c) and RFCA Attachment 14 (DOE et al 2003).
- Remove sanitary, foundation and storm drains located on the south and east side of Building 883 completely. Remaining drain locations will be removed within 3 feet of existing grade or will be disrupted to prevent their operation and movement of groundwater. Remaining sanitary sewer lines will be checked for

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possible internal contamination, and results will be evaluated in consultation with the regulatory agencies.

- If contaminated soil is removed, collect confirmation soil samples in accordance with the IASAP (DOE 2001).

It is anticipated that after remediation there may be areas with concentrations of metals, radionuclides, and organics greater than background means plus two standard deviations or detection limits, but below RFCA ALs. Ecological effects will be evaluated in the Accelerated Action Ecological Screening Evaluation (AAESE) and the ecological risk assessment portion of the Comprehensive Risk Assessment (CRA).

2.5 Stewardship Evaluation

Based on the PCOCs (Table 1) and the ER RSOP (DOE 2003a), it is anticipated that all contamination above RFCA ALs will be remediated. The following sections present the stewardship evaluation. If remediation is conducted, an additional stewardship evaluation will be performed during remediation using the consultative process and documented in a closeout report for IHSS Group 800-3. A new map of residual contamination will be generated after remediation.

2.5.1 Proximity to Other Contaminant Sources

IHSS Group 800-3 is located in the RFETS IA. With the exception of IHSS 000-162 (IA Group 000-2), the IHSS Group is 100 to 200 feet away from other neighboring IHSSs.

2.5.2 Surface Water Protection

Surface water protection includes the following considerations:

Is there a pathway to surface water from potential erosion to streams and drainages?

Soil contaminants from IHSS Group 800-3 could migrate to surface water via erosion. Most of IHSS Group 800-3 sits on the northern side of the drainage divide between South Walnut Creek and Woman Creek. Surface drainage from the IHSS Group is to the northeast where it is monitored by surface water station GS28, located just south of Central Avenue (DOE 2002a). Surface runoff is conveyed to the Central Avenue Ditch and ultimately to South Walnut Creek. Surface drainage from PAC 800-1201, located immediately south of Building 883, is to the south toward the South Interceptor Ditch (SID). The SID routes this flow to Pond C-2. The closest surface water monitoring station on the SID is SW027 located at the discharge point to Pond C-2 (DOE 2002a).

Do characterization data indicate there are contaminants in surface soil?

Existing soil data, as shown on Figure 2, indicate contaminant concentrations are less than RFCA WRW and ecological receptor ALs. However, concentrations of plutonium, americium, and uranium are higher than background levels. Additional sampling will be conducted in accordance with IASAP Addendum #IA-04-06 to further characterize IHSS Group 800-3. Results will be documented in a data summary or closeout report.

Do monitoring results from Points of Evaluation (POEs) or Points of Compliance (POCs) indicate there are surface water impacts from the area under consideration?

The findings for GS28 for Water Year 97-00 (the latest data) indicate a median plutonium concentration of 0.075 picocurie per liter (pCi/L), which was below the surface water action level of 0.15 pCi/L. However, the maximum concentration at this station was 0.852 pCi/L, which exceeded the surface water action level. Because runoff from Building 889/864 is also captured at this station, IHSS Group 800-3 cannot be conclusively identified as the source of the contamination. No other data have been collected at this station. However, in general, source evaluations concluded that Decontamination and Decommissioning (D&D) and ER projects, excavations or other routine RFETS' operations have not contributed additional actinides to South Walnut Creek (DOE 2003c). With respect to PAC 800-1201, where runoff flows to the SID, there are no surface water stations located in close proximity to this IHSS to monitor potential surface water impacts. SW027 is the closest surface water monitoring station on the SID to PAC 800-1201, and it is downgradient of many IHSSs that could contribute actinides to the Woman Creek drainage.

Is the IHSS Group in an area with high erosion potential, based on the 100-Year Average Erosion Map?

IHSS Group 800-3 is not located in an area subject to erosion in accordance with Figure 1 of RFCA Attachment 5 (DOE et al 2003).

2.5.3 Monitoring

Monitoring includes the following considerations:

Do monitoring results from POEs or POCs indicate there are groundwater impacts from the area under consideration?

Building 883 is monitored to evaluate contaminant releases to groundwater from D&D activities (DOE 2002b). Well installation and groundwater sampling activities that took place at this building during 2001 included the installation, development, and sampling of downgradient monitoring wells 83101 and 83201 (DOE 2002b). Existing monitoring wells 61099 and 61199, utilized as Building 883 upgradient wells, were also sampled. The analytical suite for Building 883 groundwater consisted of VOCs, metals, uranium isotopes, nitrate, PCBs, and total petroleum hydrocarbons (TPH).

New D&D monitoring wells 83101 and 83201 and existing wells 61099 and 61199 produced full sample suites (VOCs, metals, uranium isotopes, nitrate, PCBs, and TPH) for the fourth quarter 2001. The results of this sampling indicate VOCs are present in concentrations greater than Tier II groundwater ALs at all wells except downgradient well 83201.

Uranium-233/234 and uranium-238 were found at activities greater than Tier II groundwater ALs at wells 61099, 61199, and 83101, and at activities greater than Tier I groundwater ALs at well 83201. In addition, the uranium-235 activity at well 83201 was greater than the Tier II groundwater AL. All of the uranium isotope activities at well 83201 were greater than their respective background means plus 2 standard deviations.

Beryllium was not detected at any locations. Nitrate was detected at all locations at concentrations less than the Tier II groundwater AL. A few metal concentrations above Tier II groundwater ALs were noted, most of which were observed at downgradient well 83201. There were no detections of PCBs at any well. Additional groundwater monitoring in this area will be addressed as part of the Integrated Monitoring Plan (IMP).

Can the impact be traced to a specific IHSS Group?

Based on the high concentrations of uranium in downgradient wells relative to upgradient wells at Building 883, IHSS Group 800-3 may be a source for this radionuclide in groundwater. The VOC impacts cannot be traced specifically to IHSS Group 800-3. These contaminants are considered part of the IA Plume.

Are additional monitoring stations needed?

Not at this time. The need for and placement of monitoring stations will be re-evaluated in the Long-Term Stewardship Plan.

Can existing monitoring locations be deleted if additional remediation is conducted?

Not at this time. The current network of four wells, including two upgradient and two downgradient, should be retained to continue monitoring potential groundwater impacts from IHSS Group 800-3.

2.5.4 Stewardship Actions and Recommendations

The current stewardship actions and recommendations for IHSS Group 800-3 include:

- Use Best Management Practices (BMPs) to reduce erosion into surface water drainage.
- Implement near-term institutional controls until final closure and stewardship decisions are implemented, including the following:
  - Restrict access; and
  - Control soil excavations according to the Site Soil Disturbance Permit process.
- Implement long-term stewardship actions, including the following:
  - Prohibitions on construction of buildings in the IA;
  - Restrictions on excavations or other soil disturbance; and
  - Prohibitions on groundwater pumping in the area of IHSS Group 800-3.

These recommendations may change based on in-process remediation activities and other future RFETS remediation decisions.

2.6 Accelerated Action Remediation Goals

ER RSOP remedial action objectives (RAOs) include the following:

- Provide a remedy consistent with the RFETS goal of protection of human health and the environment;
- Provide a remedy that minimizes the need for long-term maintenance and institutional or engineering controls; and
- Minimize the spread of contaminants during implementation of accelerated actions.

2.7 Treatment

Treatment of soil is not anticipated.

2.8 Project-Specific Monitoring

High-volume air samplers may be used at the remediation area consistent with work controls to determine airborne radioactivity concentrations. Approximate locations of air samplers are shown on Figure 2.

2.9 RCRA Units and Intended Waste Disposition

RCRA Units 40.27 and 40.28 will be closed in accordance with the Facility Component Removal RSOP (DOE 2002c), as described in the RSOP Notification for Closure of Building 883 RCRA Tank Units 40.27 and 40.28, approved by CDPHE in a letter to Mr. Joseph Legare dated April 30, 2002.

2.10 Administrative Record Documents

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Golden, Colorado, June.

DOE, 1999, RFCA Standard Operating Protocol for Recycling Concrete, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2002, Final Automated Surface Water Monitoring Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Final 2001 Annual RFCA Groundwater Monitoring Report, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2002, RFCA Standard Operating Protocol for Facility Component Removal, Size Reduction, and Decontamination Activities, Rocky Flats Environmental Technology Site, Golden, Colorado.

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DOE, 2003, RFCA Standard Operating Protocol for Recycling Concrete, Revision 1, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003, Automated Surface Water Monitoring Second Quarter FY03 (Jan.-March 2003), Rocky Flats Environmental Technology Site, Golden, Colorado.

DOE, 2003, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Modification, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, U.S. Department of Energy, Colorado Department of Public Health and Environment, and U.S. Environmental Protection Agency, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement Attachment, U.S. Department of Energy, Colorado Department of Public Health and Environment, and U.S. Environmental Protection Agency, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

2.11 Projected Schedule

Remediation of IHSS Group 800-3 is expected to begin in 2nd quarter of FY05. Any significant changes to the site conditions will be addressed by the consultative process.

3.0 PUBLIC PARTICIPATION

ER RSOP Notification #05-04 activities will be discussed at the March 2005 ER/D&D Status Meeting. This Notification was provided to the local governments. It is available at the Rocky Flats Reading Rooms and on the Environmental Data Dynamic Information Exchange (EDDIE) Website at www.rfets.gov.

4.0 REFERENCES

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Golden, Colorado, June.

DOE, 1999, RFCA Standard Operating Protocol for Recycling Concrete, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

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DOE, 2002a, Final Automated Surface Water Monitoring Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002b, Final 2001 Annual RFCA Groundwater Monitoring Report, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2002c, RFCA Standard Operating Protocol for Facility Component Removal, Size Reduction, and Decontamination Activities, Rocky Flats Environmental Technology Site, Golden, Colorado.

DOE, 2003a, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Modification, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, RFCA Standard Operating Protocol for Recycling Concrete, Revision 1, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003c, Automated Surface Water Monitoring Second Quarter FY03 (January-March 2003), Rocky Flats Environmental Technology Site, Golden, Colorado.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, U.S. Department of Energy, Colorado Department of Public Health and Environment, and U.S. Environmental Protection Agency, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement Attachment, U.S. Department of Energy, Colorado Department of Public Health and Environment, and U.S. Environmental Protection Agency, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

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